CLAIMS:

1. A method for reducing the polydispersivity of a high molecular weight polymer comprising:

forming a polymer solution;

contacting the polymer solution with an anti-solvent capable of dissolving low molecular weight species but not the high molecular weight polymer;

allowing phase separation to occur to obtain a light phase and a heavy phase; and

recovering the desired polymer from the heavy phase,

wherein the resulting polymer possesses a reduced polydispersivity.

2. The method of claim 1 wherein the step of forming the polymer solution comprises adding a solvent selected from the group consisting of o-DCB, trichlorobenzene, anisole, and veratrole.

3. The method of claim 1 wherein the step of forming the polymer solution further comprises heating the polymer solution to a temperature ranging from about 50° C. to about 180° C.

4. The method of claim 1 wherein the step of contacting the polymer solution with the anti-solvent comprises an anti-solvent selected from the group consisting of toluene, ketones, acetone, tetrahydrofuran, xylenes, and dioxane.

5. The method of claim 1 wherein the step of contacting the polymer solution with the anti-solvent comprises adding anti-solvent in an amount ranging from about 1/10 to about 1/2 by weight of the solvent in the polymer solution.

6. The method of claim 1 wherein the step of contacting the polymer solution with the anti-solvent comprises adding anti-solvent in an amount of about 1/3 by weight of the solvent in the polymer solution.

7. The method of claim 1 wherein the step of contacting the polymer solution with the anti-solvent further comprises heating to a temperature ranging from about 100° C. to about 180° C.

8. The method of claim 1 further comprising concentrating and recovering the low molecular weight species in the light phase.

9. The method of claim 8 wherein the step of concentrating and recovering the low molecular weight species produces low molecular weight species selected from the group consisting of cyclic and low molecular weight linear oligomers.

10. A method for reducing the polydispersivity of a high molecular weight polyetherimide resin comprising:

forming a polyetherimide solution;

contacting the polyetherimide solution with an anti-solvent capable of dissolving low molecular weight species but not the high molecular weight polyetherimide;

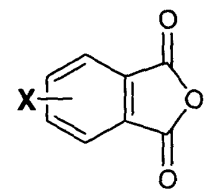
allowing phase separation to occur to obtain a light phase and a heavy phase; and

recovering the desired polyetherimide from the heavy phase,

wherein the resulting polyetherimide possessed a polydispersivity ranging from about 1.5 to about 2.5.

11. The method of claim 10 wherein the step of forming a polyetherimide resin further comprises forming a polyetherimide by reacting a bis-halophthalimide with at least one alkali metal salt of a dihydroxy-substituted aromatic compound in the presence of a phase transfer catalyst.

12. The method of claim 11 wherein the step of forming the polyetherimide comprises reacting a bis-halophthalimide produced by reacting a diamino compound with an anhydride having the following formula



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wherein X is selected from the group consisting of nitro, nitroso, tosyloxy, halogen and mixtures thereof, with at least one alkali metal salt of a dihydroxy-substituted aromatic compound in the presence of a phase transfer catalyst.

13. The method of claim 11 wherein the step of forming the polyetherimide comprises reacting a halophthalimide produced by reacting a diamino compound with an anhydride selected from the group consisting of 3-chlorophthalic anhydride, 4-chlorophthalic anhydride, dichloro phthalic anhydride, phthalic anhydride and mixtures thereof, with at least one alkali metal salt of a dihydroxy-substituted aromatic compound in the presence of a phase transfer catalyst.

14. The method of claim 11 wherein the step of forming the polyetherimide comprises reacting the anhydride with a diamino compound selected from the group consisting of ethylenediamine, propylenediamine, trimethylenediamine, diethylenetriamine, triethylenetetramine, heptamethylenediamine, octamethylenediamine, 1,12-dodecanediamine, 1,18-octadecanediamine, 3-methylheptamethylenediamine, 4,4-dimethylheptamethylenediamine, 4-methylnonamethylenediamine, 2,5-dimethylhexamethylenediamine, 2,2-dimethylpropylenediamine, N-methyl-bis(3-aminopropyl)amine, 3-methoxyhexamethylenediamine, 1,2-bis(3-aminopropoxy)ethane, bis(3-aminopropyl) sulfide, 1,4-cyclohexanediamine, bis-(4-aminocyclohexyl)methane, m-phenylenediamine, p-phenylenediamine, 2,4-diaminotoluene, 2,6-diaminotoluene, m-xylylenediamine, p-xylylenediamine, 2-methyl-4,6-diethyl-1,3-phenylenediamine, 5-methyl-4,6-diethyl-1,3-phenylene-diamine, benzidine, 3,3'-dimethylbenzidine, 3,3'-dimethoxybenzidine, 1,5-diaminonaphthalene, bis(4-aminophenyl)methane, bis(2-chloro-4-amino-3,5-diethylphenyl)methane, bis(4-aminophenyl)propane, 2,4-bis(β-amino-t-butyl)toluene, bis(p-β-methyl-o-aminopentyl)benzene, 1,3-diamino-4-

isopropylbenzene, bis(4-aminophenyl) sulfone, bis(4-aminophenyl) ether, 1,3-bis(3-aminopropyl)tetramethyldisiloxane and mixtures thereof.

15. The method of claim 12 wherein the step of forming the polyetherimide comprises reacting a bis-halophthalimide produced by reacting an anhydride with a diamino compound selected from the group consisting of m-phenylenediamine and p-phenylenediamine, with at least one alkali metal salt of a dihydroxy-substituted aromatic compound in the presence of a phase transfer catalyst.

16. The method of claim 11 wherein the step of forming the polyetherimide resin further comprises forming a polyetherimide by reacting a halophthalimide with bisphenol A disodium salt.

17. The method of claim 11 wherein the step of forming the polyetherimide resin further comprises reacting a halophthalimide with at least one alkali metal salt of a dihydroxy-substituted aromatic compound in the presence of a phase transfer catalyst selected from the group consisting of hexaalkylguanidinium alkane salts and α,ω-bis(pentaalkylguanidinium)alkane salts.

18. The method of claim 10 wherein the step of forming the polyetherimide solution comprises using a solvent selected from the group consisting of o-dichlorobenzene and anisole.

19. The method of claim 10 wherein the step of forming the polyetherimide solution further comprises heating the polyetherimide solution to a temperature ranging from about 50° C. to about 180 ° C.

20. The method of claim 10 wherein the step of forming the polyetherimide solution further comprises heating the polyetherimide solution to a temperature ranging from about 80° C. to about 110°.

21. The method of claim 10 wherein the step of contacting the polyetherimide solution with the anti-solvent comprises an anti-solvent selected from the group consisting of toluene, ketones, acetone, tetrahydrofuran, xylenes, and dioxane.

22. The method of claim 10 wherein the step of contacting the polyetherimide solution with the anti-solvent comprises adding anti-solvent in an amount ranging from about 1/10 to about 1/2 by weight of the solvent in the polyetherimide solution.

23. The method of claim 10 wherein the step of contacting the polyetherimide solution with the anti-solvent comprises adding anti-solvent in an amount of about 1/3 by weight of the solvent in the polyetherimide solution.

24. The method of claim 10 wherein the step of contacting the polyetherimide solution with the anti-solvent further comprises heating to a temperature ranging from about 100° C. to about 180° C.

25. The method of claim 10 wherein the step of contacting the polyetherimide solution with the anti-solvent further comprises heating to a temperature ranging from about 135° C. to about 150° C.

26. A polyetherimide resin produced in accordance with the method of claim 10.

27. A method for reducing the polydispersivity of a high molecular weight polyetherimide resin comprising:

forming a polyetherimide solution by reacting a halophthalimide produced by reacting a diamino compound selected from the group consisting of m-phenylenediamine and p-phenylenediamine with an anhydride selected from the group consisting of 3-chlorophthalic anhydride, 4-chlorophthalic anhydride, dichloro phthalic anhydride, phthalic anhydride and mixtures thereof, and then reacting the halophthalimide with bisphenol A disodium salt in the presence of a phase transfer catalyst selected from the group consisting of hexaalkylguanidinium alkane salts or a α,ω-bis(pentaalkylguanidinium)alkane salts;

contacting the polyetherimide solution with an anti-solvent capable of dissolving low molecular weight species but not the high molecular weight polyetherimide selected from the group consisting of toluene, ketones, acetone, tetrahydrofuran, xylenes, and dioxane;

allowing phase separation to occur to obtain a light phase and a heavy phase; and

recovering the desired polyetherimide from the heavy phase,

wherein the resulting polyetherimide possessed a polydispersivity ranging from about 1.5 to about 2.5.

28. The method of claim 27 wherein the step of forming the polyetherimide solution comprises using a solvent selected from the group consisting of o-dichlorobenzene and anisole.

29. The method of claim 27 wherein the step of forming the polyetherimide solution further comprises heating the polyetherimide solution to a temperature ranging from about 50° C. to about 180 ° C.

30. The method of claim 27 wherein the step of forming the polyetherimide solution further comprises heating the polyetherimide solution to a temperature ranging from about 80° C. to about 110°.

31. The method of claim 27 wherein the step of contacting the polyetherimide solution with the anti-solvent comprises adding anti-solvent in an amount ranging from about 1/10 to about 1/2 by weight of the solvent in the polyetherimide solution.

32. The method of claim 27 wherein the step of contacting the polyetherimide solution with the anti-solvent comprises adding anti-solvent in an amount of about 1/3 by weight of the solvent in the polyetherimide solution.

33. The method of claim 27 wherein the step of contacting the polyetherimide solution with the anti-solvent further comprises heating to a temperature ranging from about 100° C. to about 180° C.

34. The method of claim 27 wherein the step of contacting the polyetherimide solution with the anti-solvent further comprises heating to a temperature ranging from about 135° C. to about 150° C.

35. A polyetherimide resin produced in accordance with the method of claim 27.